OMB Approval 2700-0042

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		10

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0004	Sep 29, 2008		

6. ISSUED BY CODE

NASA/Stennis Space Center
Office of Procurement
Program Management Support Division
Building 1100 Room 251H
Stennis Space Center, MS 39529-6000

7. ADMINISTERED BY *(If other than Item 6)* CODE

Same as block #6

8. NAME AND ADDRESS OF CONTRACTOR *(No. Street, county, State and ZIP: Code)*

CODE FACILITY CODE

(✓)	9A. AMENDMENT OF SOLICITATION NO.
x	NNS08257126R
	9B. DATED ***(SEE ITEM 11)***
	Jul 25, 2008
	10A. MODIFICATION OF CONTRACT/ORDER NO.
	10B. DATED ***(SEE ITEM 13)***

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☒ is extended, ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning one (1) copy of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATA SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and data specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

N/A

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(✓)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation date, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

Solicitation No. NNS08257126R for Low Speed Data Acquisition System (LSDAS) Signal Conditioners and Digitizers for the A3 Altitude Test Stand is hereby amended as follows: – see attached pages 2 through 10.

Note: This amendment includes technical questions and answers only. Amendment 0005 will include the technical specification changes as a result of these questions and answers and a new date for receipt of proposals.

All other terms and conditions remain unchanged.

Except at provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
		Michelle Stracener	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		BY Michelle Stracener *(Signature of Contracting Officer)*	Sep 29, 2008

The following questions and answers are hereby incorporated into the subject solicitation.

Question: Module Power Supply Configuration
Section 3.4.1 requires that excitation power be isolated from amplifier power. Section 4.4.2 allows for up to 4 signal conditioner channels per module.

Is a 4 channel per module configuration acceptable where a single isolated excitation power supply is used as the power source for the 4 module channels (provided that all other excitation metrics are satisfied)?

ANSWER: No it is not acceptable.

Is a 4 channel per module configuration acceptable where a single isolated amplifier power supply is used as the power source for the 4 module channels (provided that all other input amplifier metrics are satisfied)?

ANSWER: No it is not acceptable.

Question: Analog Input Conditioner Capability
Is it correct that all analog input channels will meet all conditioner specifications (isolated voltage or current excitation, isolated analog input, bridge completion, etc..)? on an independent, per channel basis;

ANSWER: - No, there can be a voltage excitation module and a separate current excitation module provided all other requirements are satisfied.

OR are the signal conditioner specifications for the signal conditioner system as a whole?

ANSWER: Reference the answer to the previous question.

Question: Analog Outputs
Section 3.6.2 requires at least one filtered and one unfiltered analog output per signal conditioner.

Does this mean two outputs (filtered and unfiltered) per channel, per 4 channel module, per 64 channel chassis; Or does this mean one filtered and one unfiltered analog output per 1024 channel system?

ANSWER: The outputs are to be provided on a per channel basis.

Question: Bandwidth and Sample Rate
Section 3.5.1 requires maximum filter rate of 1 KHz. Section 3.5.2 requires minimum wideband of 50 KHz. Section 3.11.4.3 states sample rates from 1 to 1000 Hz. Section 3.11.4.9 requires minimum bandwidth of 40% of sample rate. Section 3.11.4 states that filters shall prevent any measurable aliasing at any given sample rate.

With a 6 pole filter (-48 db/octave rolloff), 1000 Hz sample rate (500 Hz Nyquist) and 0.05% measurement accuracy, section 3.11.4 would limit maximum required filter to less than 200 Hz.

What is NASA's intention? Is system installation design criteria to use filtered and wideband analog outputs (two per channel – reference above question) separate from digitized data?

ANSWER: Yes, that is the intention.

If this is design criteria, then does section 3.1.2 and section 3.11.4.9 define pass-band as 40% of sample rate with no more than 0.1 dB attenuation with stop-band defined as 0.05% measurement accuracy at Nyquist frequency?

ANSWER: Yes, that is correct.

Does this mean that there are three signal paths required per conditioner channel (filtered output, wideband output and digitized alias-free data)?

ANSWER: Yes that is correct.

Question: Removable Bridge Configuration

Section 4.3.4.6 requires bridge completion card access without removal of the conditioner module from the chassis.

Is this requirement non-negotiable?

ANSWER: If a vendor proposes a solution that does not require separate plug-in cards, such an implementation is acceptable. However, if the vendor proposes a solution that requires plug-in cards, then this requirement must be satisfied.

Would a four-channel module configuration, which allows access to bridge completion cards only upon removal from the chassis be acceptable if capability for automated read of completion card configuration was provided via software command. This approach allows verification of configuration card type without need for physical access. Physical access would then only be required to change bridge configuration card type.

ANSWER: This would be acceptable if power is not required to be removed from the chassis to remove the card, otherwise, this configuration would not be acceptable.

Question: Hot Swap of Conditioner Modules
Section 4.3.5 requires that replacement of a conditioner module shall not require removal of power to chassis.

Does this mean that a replacement of a module must be allowed while other modules are powered and continue to function? Or can chassis power be turned off with front panel power switch during module replacement and then system rebooted back to previous configuration from settings saved in non-volatile memory (ref. section 3.8.2.3)?

ANSWER: No, we cannot afford to power down a chassis unless absolutely necessary. With the quantity of channels we have in place, removal of power to remove a card is not practical for SSC.

Question: Shunt Calibration
Section 3.11.1.4 refers to selection of shunt calibration resistance from a "bank of 0.01% precision resistors or equivalent to produce resistance values ranging from 11,210 ohms to 349,650 ohms".

What are values and number of precision resistors required? What are the required values (intermediate steps) within the specified range?

ANSWER: We are deleting this requirement from the specification.

Does this refer to the ability to select from a NIST traceable "calibration bank" where the "standard" can be switched independently to any conditioner channel?

ANSWER: See answer above.

Question: Channel Density
Section 4.4.1 requires at least 160 analog conditioner channels per six foot 19" EIA standard rack.
Is this requirement non-negotiable?

ANSWER: This requirement IS negotiable.

Question: Would an analog channel density of 128 analog conditioner channels per six foot 19" rack be considered?

ANSWER: This would be acceptable, however, some of this equipment is intended to be installed in a seven (7) foot – eight (8) inch high standard EIA 19" equipment cabinet. How many channels could occupy such a space?

Question: 3.2.1.3 We are assuming that the CMRR should be 100 dB DC to 60Hz at a gain of 10 or more, not 8, with 1000 ohm impedance imbalance. Is this correct?

ANSWER: Yes, this correct, and will be changed in the amendment to the specifications.

Question: 3.2.1.10 Does this require either voltage or t-insertion, or are you requesting both methods? If both are required, could you please provide more detail on the t-insertion mode and what the expectations are?

ANSWER: There can be two ways of performing a voltage cal. One is to connect the amp input to the excitation power supply (i.e. used on thermocouples). The second one is to connect the amp input to an external supply (voltage standard or function generator). We should have both.

Question: 3.2.3.3 and 3.2.3.4 Both specs listed are RMS to DC conversion. Are these two separate modules, or can one provide an RMS to DC conversion signal conditioner?

ANSWER: Both requirements address the same module. In other words, RMS to DC Conversion module shall comply with both requirements.

Question: 3.4 Can we get a better idea as to the "special preconditioning components required by the user" requirement may be? Is this a small kluge area with a matrix of holes for special circuitry?

ANSWER: The special conditioning components for the strain gages are not required and will be deleted from specifications.

Question: 3.4.5.1 Could you please give additional detail on manual and automatic balance? Please describe the procedure the user would use in manual mode.

ANSWER: The auto balance is a software command (via GUI) that automatically balances the bridge if there is an offset so that the end result 0 volts across the bridge. This is accomplished by applying a voltage to one of the signal legs of the bridge. The manual mode is simply NOT having the autobalance option.

Question: 3.8.2.3.14 and 3.11.2 Could you please explain in more detail the expectation of resistance substitution.?

ANSWER: 3.8.2.2.13, 3.8.2.3.14 and 3.11.2 3 are being deleted from the specification.

Question: 3.11.1.4 How many selections are in the bank of precision resistors and also what values are required?

ANSWER: This is being deleted from the specification.

General Question: System bandwidth (each stage and overall) and AC accuracy: From what frequency to what frequency?

ANSWER: Section 3.5.2 of the specifications states: "The "Wideband" setting shall pass frequencies up to at least 50 KHz at 20 Volts peak-to-peak". Therefore, the system bandwidth shall be at a minimum from 0 Hz to 50KHz at Volts peak-to-peak.

AC accuracy should be better than 0.1dB.

3.2.1.1.4 An External Calibration Input:

Question: Is this to be a single external calibration input for each sub-rack of 16 modules ?

ANSWER: The external Calibration Input needs to be common to all amplifier inputs to the extent that the amplifier inputs do not load the calibration source, causing errors. As such the desire is for the calibration input to be applied to as many amplifiers as possible so that as many amplifiers batches as possible can be calibrated together. Accordingly, it may be necessary to switch banks of amplifiers to the cal source.

3.2.1.4:

Question: Is this for a CMV applied between joined inputs to output ground, ie across the isolation barrier?

ANSWER: Yes that is correct.

3.3.1.10 All inputs shall be capable of external (voltage – or T-insertion) calibration:

Question: What is "T-insertion ?" in this context. Is an extra connector required?

ANSWER: There can be two ways of performing a voltage calibration. One is to connect the amp input to the excitation power supply (i.e. used on thermocouples). The second one is to connect the amp input to an external supply (voltage standard or function generator). We require both methods.

3.3.2 Discrete Inputs:
Question: Is this a separate input connector from the sig con i/ps? The quantity of discrete inputs is not specified.

ANSWER: We anticipate that the discrete inputs would be a different kind of card/module. Regardless, it would need a separate connector.

3.2.3.7.1 The system shall have at least sixteen 16-bit accumulating counters:

Question: Are counters associated with "Discrete Inputs". Maximum input frequency for the counter is not specified.

ANSWER: These are to be distinctly different from the discrete inputs. The specifications will be changed to add Requirements 3.2.3.7.6. "The counters shall be separate and distinct from the discrete input modules." and 3.2.3.7.7. "The input frequency of the counter shall be up to 6,400 Hz".

3.2.3.7.4 Counters shall have capability to accommodate a low pass filter on the input. This filter shall be provided by the customer.

Question: How will the customer provide the low pass filter ?

ANSWER: Currently, the low pass filter is installed at the input patching of the Freq to DC conversion (Anadex unit). It is NOT installed at the input of the counter. Since we are not having patch panels on A3, the filter should be installed on the Freq to DC unit itself. This is a simple RC filter. All that is required is a place to solder a resistor and a capacitor at the input signal of the Freq to DC unit.

3.3 Excitation

Question: What is the max current from the CV supply?

ANSWER: 100 mA. This will be added to the specification.

Question: Is the module configured for +28V excitation voltage also required to provide constant current excitation? A one-time design charge will presumably apply on the first purchase of this option?

ANSWER: Constant current is not required for the +28 VDC configuration.

Question: What is the max voltage of the CC supply? (also required at 3.4.2)

ANSWER: 28VDC is the max supply voltage. This will be added to the specification.

An excitation power supply (when required) shall be an integral part of each signal conditioner but isolated from the amplifier power supply. Constant current and constant voltage shall be supported.

And also

3.4.2 The excitation power supply shall not produce over voltage due to open circuit in the constant current mode of operation. Also, it should be protected from continuous short circuit in the constant voltage mode. The excitation power supply shall be independent of the amplified power supply.

Question: Does isolation in this context mean electrical isolation of input circuit including excitation circuit from amplifier output circuit ? This is already implied by the 300V common mode specification for the inputs.
Or does it imply that isolation between the amplifier inputs and the excitation supply is required ? Does "independent of the amplifier power supply" mean something different from "isolation" ?

ANSWER: No, isolation between excitation and input circuit is not required. 300 V CMV operating range does imply isolated excitation from the amplifier power supply.

3.4.3 The excitation to be provided to the signal conditioner shall be measured by the signal conditioner at the transducer.

Can this be clarified please?

ANSWER: This specification requires remote sensing of the excitation voltage. That is, "sense" inputs so that the excitation voltage can be regulated at the transducer (which could be several hundred feet in distance).

3.4.6

Question: Is this different to the shunt calibration system described at 3.11? Can this be expanded upon please?

ANSWER: Yes, it is different. The calibration described in section 3.4.6 is intended to simulate a shunt resistance by use of a NIST traceable, programmable signal, therefore, allowing many more values than the single value the shunt resistor provides. The calibration described in section 3.11 is intended to describe a standard shunt calibration in which a calibration resistor is either installed within the transducer (typically a static pressure transducer) or on the bridge completion circuitry.

3.6.2

Question: Do the output commons have to be isolated one from another? If so what form of isolation is referred?

ANSWER: You would want them to be isolated so you don't load the signals down and noise on one channel doesn't affect others. This could be especially important for sending analog signals to controls or HSDAS.

3.6.2.4 Output Limitation: The outputs shall be limited to ± 10.00 volts full scale for outputs defined in 3.6.2.1 and 3.6.2.2

Question: Is this to be ±10Vmax exactly, ie to , say, 0.1%, or is, say ±10.5V absolute max ok?

ANSWER: We have limited this to 10.00 volts.

3.6.2.10

Question: Are these monitor points (for inspection of the signals only)

ANSWER: Yes, inspection – also known as test points.

3.11.1.4 The Signal Conditioners shall be capable of selecting shunt calibration resistance comprised of a bank of 0.01% precision resistors or equivalent to produce resistance values ranging from 11,210 ohms to 349,650 ohms.

Question: How many resistors in the bank in total and what combinations are to be selected?

ANSWER: This requirement is being deleted from the specification.

3.11.2 Resistance Substitution:

Question: Is this a resistor to be used to calibrate the constant current operation. If so is it to be "substituted for the transducer".

ANSWER: Yes, this resistor is used to calibrate the constant current operation. The resistor should be inside the amp (card) and at the time of calibration it the current goes thru this resistor instead of the transducer.

3.11.3 Voltage Substitution:

Question: Is the Voltage to be substituted for the transducer or for the excitation supply ?

Please clarify.

ANSWER: Voltage substitution connects amp input to an external source.

4.2.2.5.1 Monitor points for all signal conditioner channel signal inputs, either at module or rack adapter.

Question: Do these include 3.6.2.10?

ANSWER: Yes.

4.2.2.5.1 Monitor points for all signal conditioner channel signal outputs, either at module or rack adapter.

Question: Is this in addition to the filtered and unfiltered outputs ? If so is it filtered or unfiltered ?

ANSWER: Yes, these are in addition to the filtered and unfiltered outputs. Filtering of these outputs shall correspond to output being monitored. For instance, the monitor point for the filtered output shall reflect the filtering at the filtered output and the monitor point for the unfiltered output shall reflect the filtering at the unfiltered output. All monitor points shall be buffer isolated from the point being monitored.

4.2.2.5.4 A monitor point at the local system for excitation, voltages, calibration voltages, inputs, outputs, etc. (if not already located on the front panel). This monitor point shall have a maximum resolution of 0.01% (i.e. 0.10mV at 10V of the signal input)..

Question: What is meant by the "local system" ? What does "etc." include ? Can this sub-section be clarified ?

ANSWER: The portion of the system that is located within the Signal Conditioning Building at or near the test stand. Reference Figure 1 of the specifications.

4.3.4.1 A removable completion card shall be provided for each signal conditioner, whether it is a bridge completion signal conditioner, an RTD signal conditioner, a voltage amplifier, or a thermocouple signal conditioner.

Question: What will be the function of the "completion card" if the module is a separate module from the "bridge completion signal conditioner" ? (see 3.3.3)

ANSWER: We need a bridge completion function regardless of where the signal conditioner resides.

6.2 Signal conditioning modules and all signal connections shall be isolated from the rack adapter, including front panel mounting screws and/or other conductive parts.

Question: The isolation of signal connections is reasonable, but the module front panel may need to be electrically connected to chassis for EMC reasons.

ANSWER: Agreed. Any connectors on the chassis or front panels need to be isolated, however.